

Understanding the Ecological Risks, Costs, and Benefits of Use Attainment

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States are required to adopt designated uses or goals that protect the natural integrity of the nation's waters and their uses by people and aquatic organisms under Section 303(c) of the Clean Water Act (CWA). However, the CWA also recognizes that, in some cases, states may evaluate changes to a designated use when natural, man-made, or socioeconomic factors preclude its attainment. Decisions related to attaining or changing a designated use inevitably involve trade-offs (i.e., gains and losses) among health, ecological, institutional, and socioeconomic considerations. The U.S. Environmental Protection Agency's (U.S. EPA) Interim Economic Guidance allows the consideration of these benefits, such as ecological benefits. Recently, environmental scientists, economists, and social scientists have developed a framework for analyzing these trade-offs and assessing the impacts associated with meeting or changing water quality goals. Two important components of the framework are (1) expanded conceptual models, or flow diagrams, to illustrate the relationship among use attainment decisions, related management alternatives, and the effects on ecosystems, ecosystem services, and ecological benefits and (2) tools for eliciting community preferences related to these decisions. We demonstrate the potential usefulness of expanded conceptual models by applying them to five case studies. We also provide information that will allow decision-makers to compare the advantages and disadvantages of different tools for preference elicitation or preference revelation. The right tool, or combination of tools, will vary according to the attributes of the body of water, the type of water quality impairments involved, and the characteristics of the affected stakeholders. To facilitate collaboration, we are working with the Office of Water/Office of Science and Technology to bring states, communities, watershed groups, and the U.S. EPA regions together in a workshop to test the framework using actual use attainment issues. Results of the workshop will provide a guide for implementing the process in local water quality decisions. We expect this research to enable states and the communities affected by these decisions to make these trade-offs in ways that enhance their overall quality of life while complying with the provisions of the CWA.

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